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Method and Device for the Production of Filled and Sealed Containers

The invention relates to a method and device for the production of filled and sealed containers having the features of the preamble of claim 1, and a device for executing such a process.

The known process of the initially mentioned type makes it possible to economically produce, fill, and seal containers, even under aseptic conditions. It is therefore widely used. In all cases in which the contents are sensitive to oxygen, it is however necessary to provide either the container with repackaging or to use glass containers. Both alternatives greatly increase production costs.

Therefore the object of the invention is to devise a process of the initially mentioned type which can also be used when the contents are sensitive to oxygen. This object is achieved by a process with the features specified in claim 1.

When specifically the extruded tube is formed from at least one layer which makes the container impermeable to oxygen when the contents are sensitive to oxygen, it is not necessary to produce a blocking layer for oxygen by means of additional repackaging or to use a glass container.

If this layer is also able to meet other requirements which are imposed on the wall of the container, it is not necessary to provide coextrusion of at least two layers. In many cases however, to meet the imposed requirements and/or for reasons of economy, it is advantageous to form the tube by coextrusion from two or more layers which can then consist of materials with different properties.

Since with known machines for producing filled and sealed containers only tubes which consist of a single layer can be extruded, the object of the invention is also to devise a device which economically allows coextrusion. This object is achieved by a device with the features specified in claim 1.

The assignment of the extrusion head and the pertinent extruder on the one hand and of the blow-fill-seal means on the other to separate racks on the one hand makes it possible to easily accommodate the increased number of components. On the other hand, in this way different extrusion units can be combined with different blow-fill-seal means, enabling adaptation to different requirements without difficulty.

For purposes of the highest degree of flexibility, it is furthermore advantageous to make the control cabinet necessary for the power supply and control likewise as a separate unit which can be set up wherever this is especially advantageous with respect to available space.

The invention will be detailed below using one exemplary embodiment of the device as claimed in the invention shown in the drawings.

- FIG. 1 shows a side view of the exemplary embodiment,
- FIG. 2 shows a front view,
- FIG. 3 shows a top view.

A device for the production of filled and sealed containers, for example ampules filled with a pharmaceutical preparation, has a first rack 1 bearing the extruder 2, which can have a varied size, as shown in FIG. 3. In the exemplary embodiment there is a larger extruder between two smaller extruders. The extruders 2 are all at the height of the extrusion head 3 which on its bottom has an outlet opening for a tube. Furthermore the extrusion head 3 is made such that coextrusion of three layers which jointly form the tube is possible. The tube head 3 is securely connected to the rack 1 by way of the extruders 2.

A second rack 4 is connected to that side of the frame 1 above which the extruders 2 project; the rack 4 bears two blow-fill-seal means at a distance adjacent to each other and both are made the same. Each of these two means has a blow mold which is divided in the vertical direction and which can be positioned underneath the extrusion head 3.

After the tube emerging from the extrusion head 3 has reached a length such that its lower end extends to the lower end of the blow mold, the latter is closed. Instead of blowing the ampule or the ampules, filling and then sealing them in this position of the blow mold, as is conventional in the known devices, in the exemplary embodiment the tubing is cut off above the blow mold and the blow mold is in its initial position underneath the associated blowing and filling device 5. The two blowing and filling devices 5 are located, as shown in FIGS. 2 and 3, next to one side or the other of the extrusion head 3. At this point the other blow mold is moved into the position underneath the extrusion head 3 at the same time in order to be able to accommodate an extruded tube there, and air for the blowing process is forced into the tube located in the other blow mold. This is followed by adding the contents through the still open head of the ampule or ampules. Only when filling is ended are the parts of the blow mold which mold the head moved together and the head of the ampule or ampules is/are finish-molded and sealed. Correspondingly after the other blow mold has been pushed back into its initial position one or more ampules are blown from the tube located in it and they are then filled and sealed.

The contents of the ampules are protected both against moisture and also against oxygen, because one of the layers comprising the wall of the ampules prevents oxygen from diffusing through and the other two layers form a water vapor barrier. Therefore the ampules, after they have been ejected and excess plastic parts have been removed, need not be provided with barrier-forming repackaging. The two conveyor means with which the finished ampules are removed are shown schematically in FIG. 3 and labeled 6.

The power supply of all assemblies takes place by way of a control cabinet 7 which also contains all the controls. The control cabinet 7 is a separate component which can be set up wherever this is most advantageous. In the exemplary embodiment the control cabinet 7 is next to the first rack 1 connected to the back of the second rack 4.

All features mentioned in the above specification as well as those that can be taken only from the drawing are components of the invention as further embodiments, even if they are not particularly emphasized and not specifically mentioned in the claims.